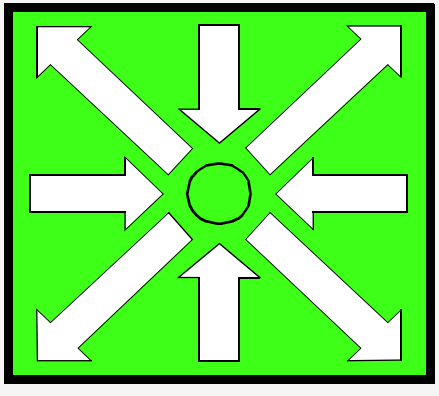
SPECTRUM®

From a p r i s m a Management Technologies

SPECTRUM Enterprise Manager

Device Management

SmartSwitch Router



Supports Management Module SM-CSI1091 and SM-ENT1001

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Aprisma Management Technologies, Inc.
121 Technology Drive
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Introduction

This section introduces the SPECTRUM Device Management documentation for SmartSwitch Router devices.

This introduction contains the following topics:

- *Purpose and Scope*
- *Required Reading*
- *Overview* (Page 6)
- *Supported Devices* (Page 7)
- *The SPECTRUM Model* (Page 8)

Purpose and Scope

Use this document as a guide for managing the SmartSwitch Router devices described on Page 7 with SPECTRUM management modules SM-CSI1091 and SM-ENT1001 (designed for the 6-SSRM-02 module). This document describes the icons, menus, and views that enable you to remotely monitor, configure, and troubleshoot SmartSwitch Router devices through software models in your SPECTRUM database.

Information specific to SM-CSI1091 and SM-ENT1001 is what is primarily included in this document. For general information about device management using SPECTRUM and explanations of SPECTRUM functionality and navigation techniques, refer to the topics listed under *Required Reading*.

Required Reading

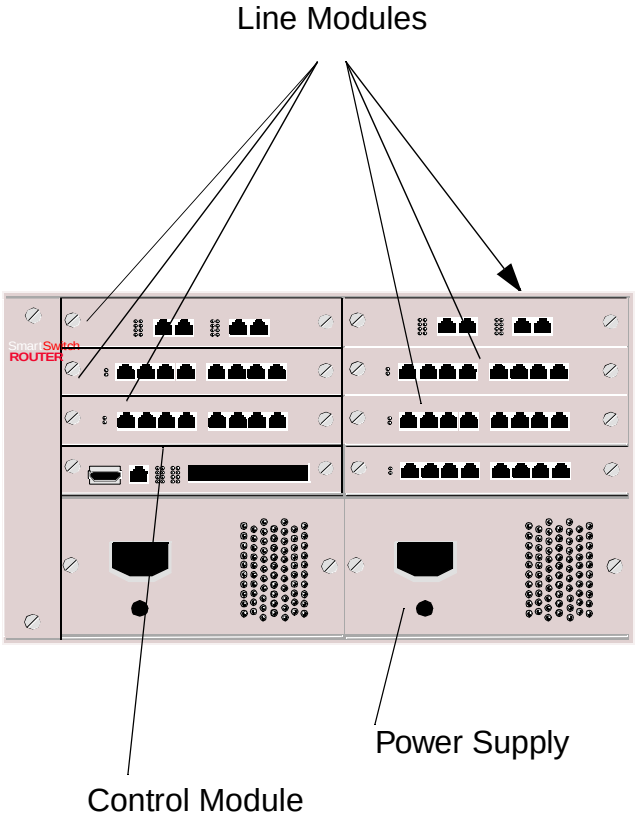
To use this documentation effectively, you must be familiar with the information covered by the other SPECTRUM online documents listed below.

- ***Getting Started with SPECTRUM for Operators***
- ***Getting Started with SPECTRUM for Administrators***
- ***How To Manage Your Network with SPECTRUM***
- ***Autodiscovery User's Guide***
- ***Core Watch User's Guide***
- ***SPECTRUM Views***
- ***SPECTRUM Menus***
- ***SPECTRUM Icons***

Overview

The SmartSwitch Router (Figure 1) is a Gigabit Ethernet/wide-area router that consists of a fan-cooled 8-slot or 16-slot chassis. The SSR-8000 can support up to seven hot-swappable line modules with one control module and two power supplies for power redundancy. A second control module can be added for redundancy at the expense of one of the line cards. Similarly, the SSR-8600 can support up to 15 line cards, or 14 if a second control module is installed.

Figure 1: SmartSwitch Router



Supported Devices

The SmartSwitch Router includes a Control Module and Line Modules as described below:

Control Module

The control module is used to manage the line modules. It is responsible for maintaining route table and bridge table information, SNMP management, and system housekeeping. It has a 200 MHz R5000 processor that runs spanning tree algorithms and routing protocols such as RIP, BGP4 and OSPF. It has two front panel interfaces for side and out-of-band management.

Table capacity is based on the amount of memory within the control module. Configurations may be either 64 MB for up to 50,000 routes, or 128 for up to 100,000 routes.

Line Modules

The line modules determine the number of flows that a SmartSwitch Router can handle. Line modules with 4 MB of memory can support up to 500,000 L4 flows, with 16 MB they can support up to 2,000,000 flows. The line modules store bridge table and MAC address information from the L2 table on the control module.

Table 1 through Table 4 list the line modules that are supported:

Table 1: Cabletron Devices

Device	Model Type	MM
SSR-32000	SmartSwRtr32	SM-CSI1091
SSR-8600 SSR-8000 SSR-3000 SSR-2100 SSR-2000 SSR-1200 IA-1100	SmartSwRtr	SM-CSI1091

Table 2: Enterasys Devices

Device	Model Type	MM
X-Pedition ER16	SmartSwRtr32	SM-CSI1091
X-Pedition 8600 X-Pedition 8000 X-Pedition 2100 X-Pedition 2000	SmartSwRtr	SM-CSI1091
6-SSRM-02	6_SSRM_02	SM-ENT1001

Table 3: Riverstone Devices

Device	Model Type	MM
RS-32000	SmartSwRtr32	SM-CSI1091
RS-8600 RS-8000 RS-3000 RS-2100 RS-2000 IA-1200 IA-1100	SmartSwRtr	SM-CSI1091

Table 4: Terayon Devices

Device	Model Type	MM
BE2xx	BE2xx	SM-TRN1000
TL1000	TL1000MC	SM-TRN1000
TLGateway	TLGWay	SM-TRN1000

Note: Compaq, DEC and Olicom variants of 2000, 8000 and 8600 are also managed as SmartSwRtr from SM-CSI1091.

The SPECTRUM Model

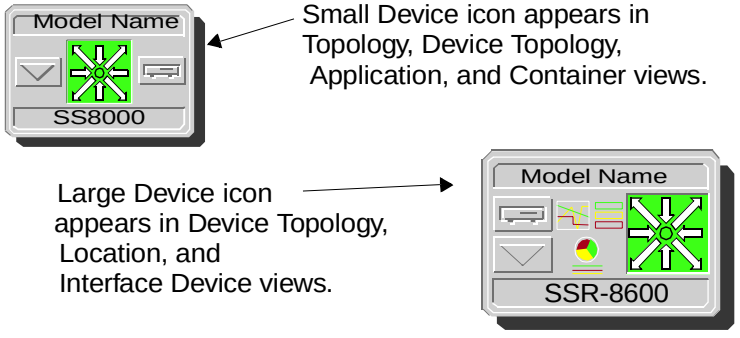
The model types for the SmartSwitch Router devices are **SmartSwRtr**, **6_SSRM_02** for the 6-SSRM-02, and **SmartSwRtr32** for the RS-3200 and the X-Pedition ER16. Once modeled, the type of device is displayed in the Device icon's Model Type label. The Model Type label is updated to indicate the SSR type e.g., SSR-8000 or SSR-8600.

Modeling results in the creation of Device icons that represent the devices and Application icons that represent their supported applications.

The Device icons contain double-click zones and provide access to Icon Subviews menus that let you perform device management activities such as those listed in *Tasks* on Page 10.

As Figure 1 shows, the appearance of the Device icons varies slightly depending on the kind of view it appears in.

Figure 2: Small and Large Device Icons


Model Name
SS8000
Small Device icon appears in Topology, Device Topology, Application, and Container views.
Large Device icon appears in Device Topology, Location, and Interface Device views.
Model Name
SSR-8600

The device-specific Icon Subviews menu options available from the Device icon are listed below.

Option	Accesses the...
Device	*Device Views* (Page 11)
Dev Top	*Device Topology Views* (Page 19)
Application	*Application Views* (Page 21)
Configuration	*Configuration Views* (Page 32)
Rtr Redundancy	*Redundancy and Model Reconfiguration Options View* (Page 37)
Chassis	*SSR Chassis Application (SSR_ChasApp)* (Page 23)
Fault Isolation	Opens the Fault Isolation View. For information on this, refer to ***SPECTRUM Views***.
Model Information	*Model Information View* (Page 46)
Primary Application	Menu options that let you select Routing, Gen Bridge App, MIB-II, Ethernet App or rfc2338App as the primary application.
Core Watch	*Core Watch Application* (Page 45)

The following views are accessible from the Device icon for the SmartSwitch Router.

- *Device Views* (Page 11)
- *Device Topology Views* (Page 19)
- *Application Views* (Page 21)
- *Performance Views* (Page 30)
- *Configuration Views* (Page 32)
- *Core Watch Application* (Page 45)
- *Model Information View* (Page 46)

Tasks

This section contains an alphabetical list of device management tasks, with each task providing one or more links to views that let you perform the task.

Application Information (examine)

- *Application Views* (Page 21)

Device (configure)

- *Device Views* (Page 11)

Enable/Disable a Port (examine/modify)

- *Interface Status View* (Page 14)
- *Admin. Status* (Page 33)
- *Admin Status* (Page 37)

Identify Current Protocols (monitor)

- *Service Status View* (Page 26)

Interface or Port Operation (monitor)

- *Device Views* (Page 11)
- *Interface Label Icon Subviews Menu* (Page 13)
- *Device Topology Views* (Page 19)
- *Operation Status* (Page 37)
- *Core Watch Application* (Page 45)

Model the SmartSwitch Router (modify)

- *The SPECTRUM Model* (Page 8)

Port Statistics (monitor)

- *Device Performance View* (Page 31)
- *IF Performance View* (Page 31)

Set Automatic Configuration Updates (modify)

- *Core Watch Application* (Page 45)

Set Interface Thresholds (modify)

- *IF Thresholds* (Page 17)

Set Redundant Routes (modify)

- *Core Watch Application* (Page 45)

Transfer Configuration File (modify)

- *Configuration Views* (Page 32)

Device Views

This section describes the Device views and subviews available for models of SmartSwitch Router devices in SPECTRUM.

These views display icons and labels that represent the device, its modules and ports or interfaces, and applications. This view is described in general under ***SPECTRUM Views*** within the SPECTRUM online documentation. The information provided within this document is specific to this device. The following Device views are available for the SmartSwitch Router:

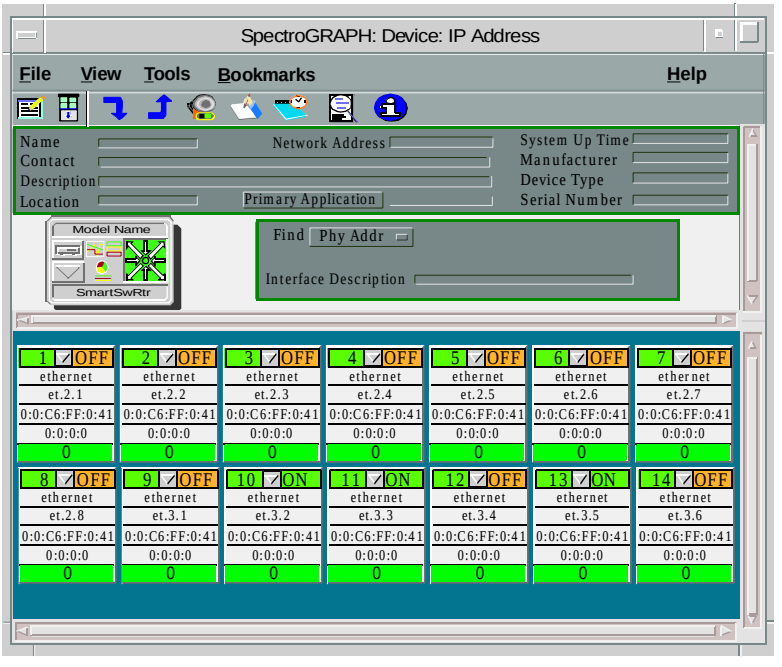
- *Interface Device View*
- *Chassis Device View* (Page 14)
- *Chassis Device View for the 6-SSRM-02* (Page 17)

Interface Device View

Access: *From the* ***Icon Subviews*** *menu for the Device icon, select* ***Device > Interface****.*

This view displays icons (Figure 3) that represent the interfaces for the SmartSwitch Router.

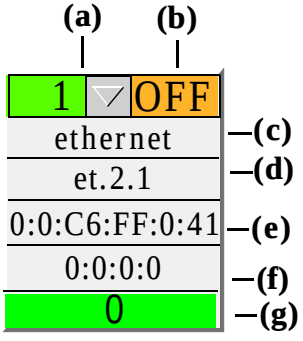
Figure 3: Interface Device View


SpectroGRAPH: Device: IP Address
File View Tools Bookmarks Help
Name
Contact
Description
Location
Network Address
Primary Application
System Up Time
Manufacturer
Device Type
Serial Number
Model Name
SmartSwRtr
Find Phy Addr
Interface Description
1 OFF ethernet et.2.1 0:0:C6:FF:0:41 0:0:0:0 0
2 OFF ethernet et.2.2 0:0:C6:FF:0:41 0:0:0:0 0
3 OFF ethernet et.2.3 0:0:C6:FF:0:41 0:0:0:0 0
4 OFF ethernet et.2.4 0:0:C6:FF:0:41 0:0:0:0 0
5 OFF ethernet et.2.5 0:0:C6:FF:0:41 0:0:0:0 0
6 OFF ethernet et.2.6 0:0:C6:FF:0:41 0:0:0:0 0
7 OFF ethernet et.2.7 0:0:C6:FF:0:41 0:0:0:0 0
8 OFF ethernet et.2.8 0:0:C6:FF:0:41 0:0:0:0 0
9 OFF ethernet et.3.1 0:0:C6:FF:0:41 0:0:0:0 0
10 ON ethernet et.3.2 0:0:C6:FF:0:41 0:0:0:0 0
11 ON ethernet et.3.3 0:0:C6:FF:0:41 0:0:0:0 0
12 OFF ethernet et.3.4 0:0:C6:FF:0:41 0:0:0:0 0
13 ON ethernet et.3.5 0:0:C6:FF:0:41 0:0:0:0 0
14 OFF ethernet et.3.6 0:0:C6:FF:0:41 0:0:0:0 0

Interface Icons

This section describes the icons that represent the front panel interfaces on the SmartSwitch Router line modules. Figure 4 shows the interface icon and its labels/double-click zones.

Figure 4: Interface Icon



a *Port Number Label*

b *Administrative Status Label*

c *Interface Type Label*

d *Interface Description Label*

e *Physical Address Label*

f *IP Address Label*

g *Gauge Label*

Port Number Label

This label identifies this port. The number represents the port number on this module.

Note: Double-clicking on the “down arrow” in the Interface Icon allows you to drill down through the layers, starting with the physical and going to the IP Forwarding layer.

Administrative Status Label

This label displays the administrative state of this port. It also provides double-click access to the *IF Status* (Page 13) view.

Table 5 lists the possible states relative to the application selected. The default application for this view is Physical (MIB-II). To select the application to be displayed (Physical or Bridging), click the **Filter** menu button in the Interface Options panel.

Table 5: Interface Status Label Colors

Color	Operational Status	Administrative Status	Label Text
Green	ON	ON	ON
Blue	OFF	OFF	OFF
Yellow	OFF	ON	OFF
Red	Testing	Test	TST

Interface Type Label
This label displays the type of network interface module. Double-click this label to open the *Interface Configuration View* (Page 32).

Interface Description Label
This label identifies the type of network to which this interface is connected. Double-click the label to open the *Model Information View* (Page 46) for the interface.

Physical Address Label
This label displays the physical (MAC) address of the interface.

IP Address Label
This label displays the IP address for the interface. Double-click the label to open the *Secondary Address Panel* (Page 14), which allows you to change the address and mask for this interface.

Gauge Label
Displays the statistic selected from the Gauge Control Panel described in ***SPECTRUM Views*** and provides double-click access to the Performance view.

Interface Label Icon Subviews Menu

Table 6 lists each of the Icon Subviews menu selections available for the Interface Label.

Table 6: Interface Label Icon Subviews Menu

Option	Opens the ...
IF Details	Interface breakdown detail view displays three pie charts of packet, error, and discard information See ***SPECTRUM Views*** for more details.
IF Status	*Interface Status View* allows you to set the operational status (turn the port on or off) through the Administrative Status button.
IF Configuration	*Interface Configuration View* (Page 32) provides interface specific configuration information.

Table 6: Interface Label Icon Subviews Menu

Secondary Address Panel	*Secondary Address Panel* displays the current IP address for this interface.
IF Thresholds	Interface Threshold view, which lets you set the on/off alarm thresholds for load, packet rate, error rate, and % discarded for the interface.
Model Information	*Model Information View* (Page 46) for this interface.

Interface Status View

Access: *From the **Icon Subviews** menu for the Interface icon in the Interface Device view, select **IF Status**.*

The Interface Status view provides the following information on the status of the interface:

Operational Status

Displays the current operational state of the interface is displayed (`Up`, `Down`, `Testing`, or `Unknown`).

Administrative Status

Allows you to select the desired operational state of the interface (`On`, `Off`, or `Testing`).

Secondary Address Panel

Access: *From the **Icon Subviews** menu for the Interface icon in the Interface Device view, select **Secondary Address Panel**.*

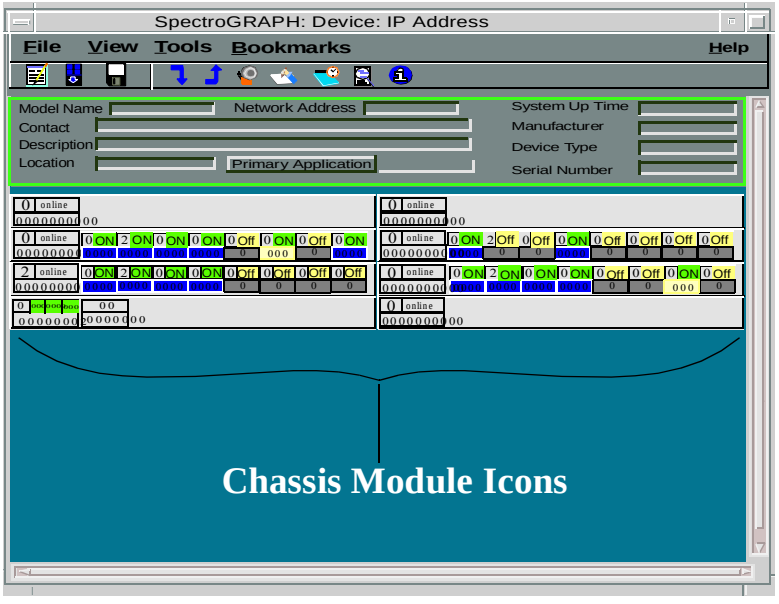
This panel provides a table of IP addresses and masks obtained from the Address Translation Table within the device's firmware. You can change the current address displayed in the **IP Address** field by selecting an entry from the table in this panel and clicking the **Update** button.

Chassis Device View

Access: *From the **Icon Subviews** menu for the Device icon, select **Device > Chassis**.*

This view (Figure 5) shows an example of a Chassis Device View, which displays the modules contained within the chassis, their location, and ports. The ports are represented by dynamic icons that display operational status.

Figure 5: Chassis Device View



Chassis Module Icons

These icons (Figure 6) represent the physical modules as installed in the chassis.

Module Identification Labels

These labels display the following information:

Slot Number Label

The location of the module within the chassis.

Model Type Label

The type of network interface module in the chassis slot.

Interface Labels

These labels display the following information:

Interface Type Label

The number and type for this interface.

Interface Status Label

The current operating status of this interface.

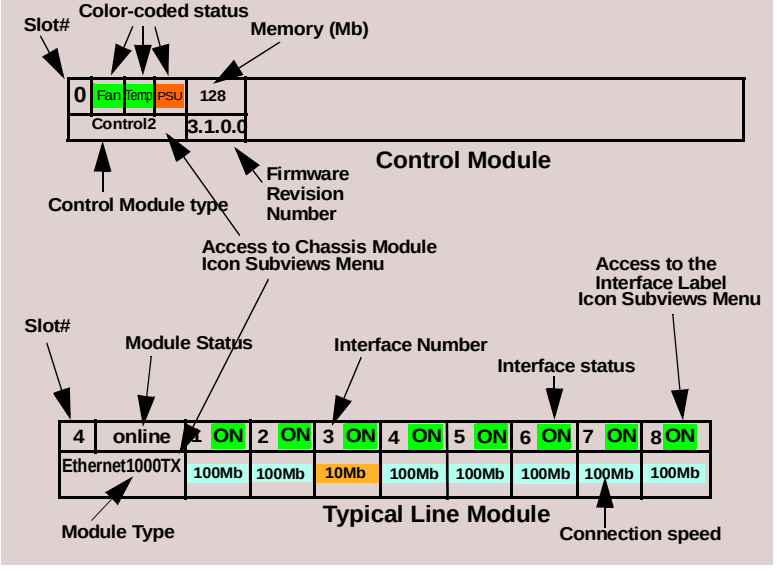
Chassis Module Icon Subviews Menu

The only Icon Subviews menu selection specific to the Chassis Module for each device within the SmartSwitch Router chassis are:

Module Notes - Opens the Module Notes window, which allows you to write and save notes for the selected module within this Chassis view.

Board Detail - Opens the *Router Module Detail View*.

Figure 6: Chassis Module Icon



Router Module Detail View

Access: *From the **Icon Subviews** menu for the Chassis Module, select **Board Detail**.*

This view displays the following information:

Slot
The physical slot number of the module.

Module Description
The description of the module. For the Control Module, it should have the software version, the amount of dynamic RAM, and flash RAM.

Version
The alphanumeric version string for this module.

Status
The current status of this module. Valid values are: `online`, and `offline`.

Service
The service identifier string for this module.

Module Type
The physical module type.

Memory (Mb)
System Memory size available on the Module. reports `-1` if no memory exists on this module, such as power supplies.

Number of Ports
The number of physical ports on this module.

Line Module Icon Subviews Menu

Table 7 describes each of the device-specific Icon Subviews menu options available for the Line Module.

Table 7: Line Module Icon Subviews Menu

Option	Opens the ...
IF Performance	*IF Performance View* (Page 31).
IF Details	Interface breakdown detail view which displays three pie charts of packet, error, and discard information described in detail in the ***SPECTRUM Views*** documentation.
IF Status	*Interface Status View* (Page 14) allows you to set the operational status (turn the port on or off) through the Administrative Status button.
IF Configuration	*Interface Configuration View* (Page 32) provides interface specific configuration information.
Network Information Panel	Network Information Panel.
IF Thresholds	Interface Threshold View allows you to view and set the thresholds for this interface.
Model Information	*Model Information View* (Page 46) for this interface.

Chassis Device View for the 6-SSRM-02

Access: *From the **Icon Subviews** menu for the 6-SSRM-02, select **Device > Chassis**.*

This view displays the Chassis Information for the 6-SSRM-02 device:

Power Redundancy

Displays the source of power for the chassis. `Redundant` indicates that power from the secondary source is being used for the chassis. `NON_redundant` indicates that power from the primary source is being used.

PS #1 Status

The status for power supply one.

PS #2 Status

The status for power supply two.

Chassis Fans

Displays the operation state for the chassis fans. Table 8 displays the state and color indications for the power supplies and chassis fans:

Table 8: Chassis Information Status

Color	Definition
Green	Normal
Gray	Not Installed
Red	Not operational
Blue	Unknown

Device Topology Views

This section provides brief descriptions of the Device Topology views available for models of SmartSwitch Router devices in SPECTRUM.

Device Topology views show the connections between a modeled device and other network entities. The SmartSwitch Router has two Device Topology views:

- *Chassis Device Topology View*
- *Interface Device Topology View*

Chassis Device Topology View

Access: *From the **Icon Subviews** menu for the Device icon, select **DevTop > Chassis**.*

Figure 7 shows an example of the Chassis Device Topology view. The lower panel of the view uses Interface icons to represent the device's serial/network I/O ports for a selected module. The port labels in this view provide the same information and menu options as those described under the *Interface Icons* (Page 12).

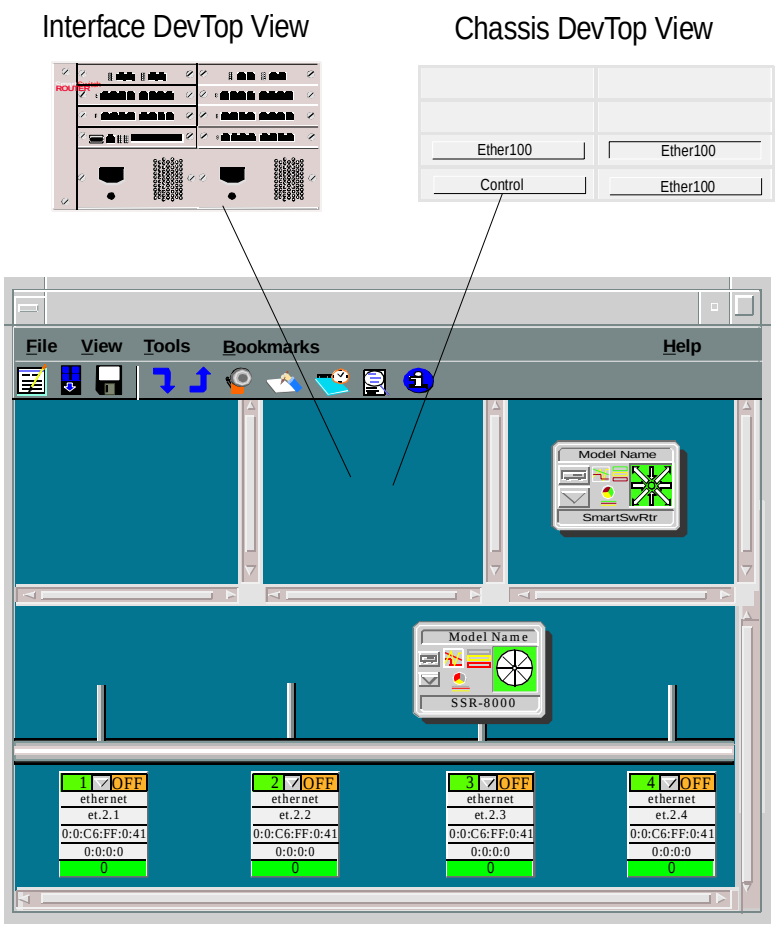
Interface Device Topology View

Access: *From the **Icon Subviews** menu for the Device icon, select **DevTop > Interface**.*

The lower panel of the Interface Device Topology view (Figure 7) uses interface icons to represent the device's serial/network I/O ports. These icons provide the same information and menu options as those in the *Interface Device View* (Page 11). If there is a device connected to a particular interface, a device icon appears on the vertical bar above the interface icon with an icon representing the network group that contains the device.

For further information on Device Topology views, refer to ***SPECTRUM Views***.

Figure 7: Device Topology View



Note: In the Chassis Device Topology view, only interfaces for a selected module will be displayed. For the Interface Device Topology view, all interfaces for each module will be displayed.

Application Views

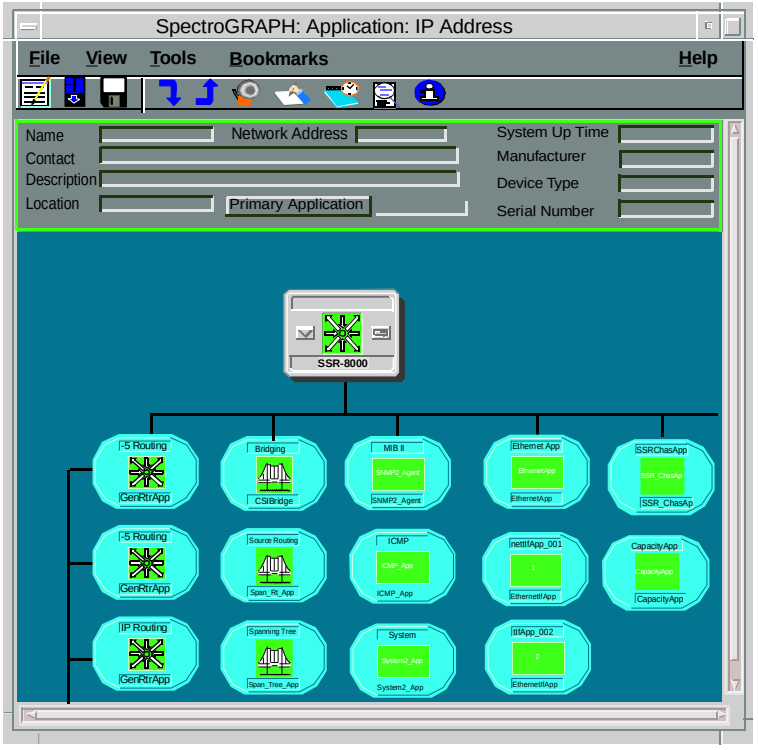
This section describes the main Application view and the associated application-specific subviews available for models of SmartSwitch Router devices in SPECTRUM.

Access: *From the* ***Icon Subviews*** *menu for the Device icon, select* ***Application****.*

Main Application View

When a device model is created, SPECTRUM automatically creates models for each of the major and minor applications supported by the device. The main Application view identifies all of these application models, shows their current condition status, and provides access to application-specific subviews. Figure 8 shows this view in the Icon mode. If you prefer the List mode, which displays applications as text labels, select **View > Mode > List**.

Figure 8: Application View



Supported Applications

SPECTRUM's applications can be grouped within three general categories as follows:

- *Common Applications*
- *Optional Applications*
- *Device-Specific Applications* (Page 23)

Common Applications

For the most part, these applications represent the non proprietary MIBs supported by your device. Listed below (beneath the title of the document that describes them) are some of the common applications currently supported by SPECTRUM.

Note: The documents listed are available for viewing at: **www.aprisma.com/manuals/**

- ***Bridging Applications***
  - Spanning Tree
  - Static
  - Transparent
  - PPP Bridging
  - Source Routing
  - Translation
  - QBridge
- ***Routing Applications***
  - Generic Routing
  - IP Routing
  - Open Shortest Path First
- ***MIB II Applications***
  - SNMP
  - IP
  - ICMP
  - TCP
  - System2
  - UDP
- ***Miscellaneous Applications***
  - Ethernet
  - ctDownload

Optional Applications

- Routing Services (CtRouter)
- DLM (DLM_Agent)
- Standard RMON (RMONApp)
- SecureFast VLAN (SFVLANApp)

Device-Specific Applications

The views and subviews available for SmartSwitch Router device-specific applications are described in the rest of this section, grouped by major application as listed below:

- *SSR Chassis Application (SSR_ChasApp)*
- *Container Application (ContainerApp)* (Page 26)
- *VRRP Application (rfc2338App)* (Page 29)

SSR Chassis Application (SSR_ChasApp)

This major application (SSR_ChasApp) has a single minor application: *Capacity Application Configuration View* on Page 33 (CapacityApp). It also provides the following application-specific subviews:

- *Module Hardware View*
- *Port Hardware View* (Page 24)
- *Environment View* (Page 24)
- *Service Status View* (Page 26)

Module Hardware View

Access: *From the **Icon Subviews** menu for the SSR_ChasApp Application icon, select **Module Hardware**.*

This view provides information about the modules installed in the chassis, such as slot location, and module type.

Module Hardware

This section of the Module Hardware view identifies the modules installed in the chassis by providing the following information:

Module
Displays the location of the module in the chassis.

Description
Describes the module installed in the location listed under “Module.”

Ports
Displays the number of ports for that module.

Version
Displays the hardware version of that module.

Mem
The amount of memory on a module (in Mbytes).

Service
The Aprisma service identifier string for this card/module. Unique to a module in production, used by Aprisma Service and Manufacturing to identify shipped inventory.

Port Hardware View

Access: *From the **Icon Subviews** menu for the SSR_ChasApp Application icon, select **Port Hardware**.*

This view provides information about the ports for all modules installed in the chassis, such as slot number for the module, port number, and port types.

Port Hardware

This section of the Port Hardware view identifies the ports on the line modules installed in the chassis by providing the following information:

Module
Displays the location of the module in the chassis.

Port
Displays the port number for that module.

Port Type
Displays the type of port. For example “etherfast” - for a Fast Ethernet port.

Connector Type
Displays the type of port connector being used.

IF Index
Displays the entry in the MIB-ll Interface Table corresponding to this port.

Environment View

Access: *From the **Icon Subviews** menu for the SSR_ChasApp Application icon, select **Environment**.*

This view provides information about the conditions of the chassis, such as power supply operation, and fan operation.

Chassis ID
Displays the unique identification number for this chassis.

Num Slots
Displays the total number of slots for this chassis.

Last Hot Swap
The time the module was last hot swapped.

Fan
Indicates whether or not the fan is functioning.

Temperature
Indicates whether or not temperature control is functioning.

CM Backup State

Indicates status of the backup Control Module.

Note:

Regardless of which Control Module happens to be Primary, the Administrator can set up an Alarm Watch to be notified of the failure of the backup module. Select the device, then from the device menu select **Utilities>Watch Manager**. Highlight BackupCMwatch and make the watch Active. The selected watch will now enter the Initial watch status.

Power Supply

Displays the status of each of the power supplies. An Alarm Watch is applied to the power supplies by default and the Administrator is notified at the failure of either Primary or Secondary PSU.

Switch Fabric

If a redundant switch fabric is employed, this icon indicates which is primary and which is backup. The Administrator can set up an Alarm Watch on the switch fabrics to activate if either device fails. To do this:

1 Select device, then from device menu select **Utilities> Watch Manager**.

Note that the selected model is highlighted on the left, and three watches are shown on the right.

FabricStatewatch is shown as **inactive**.

2 Highlight FabricStatewatch and select **Activate**.

The selected watch will now enter the **Initial** watch status.

Any change in the watched attributes, which are polled at the device model polling interval, will now trigger the appropriate watch, with corresponding event and alarm information. The alarm will be cleared should the watched attribute return to its expected value. Note that the SpectroSERVER would need to be restarted to recognize existing bad values.

Alternatively the watch editor can be used to change the watch properties from ByIMT to By Polling, setting the watch poll period to an appropriate interval and activating the watch. Now an alarm will be generated at each watch poll period if the value is not as expected.

Control Module

Status of the shelf/chassis Active Control Module's four LED displays.

Service Status View

Access: *From the **Icon Subviews** menu for the SSR_ChasApp Application icon, select **Service Status**.*

This view provides status of the routing protocols such as; RIP, OSPF, and BGP, and multicast protocols such as; IGMP, DVMRP, and PIM.

RIP
Displays the current status of RIP in the switch.

OSPF
Displays the current status of OSPF in the switch.

BGP
Displays the current status of BGP in the switch.

DVMRP
Displays the current status of DVMRP in the switch.

IPX SAP
Displays the current status of IPX SAP in the switch.

IPX RIP
Displays the current status of IPX RIP in the switch.

LFAP
Displays the current status of the LFAP in the switch.

STP
Displays the current status of STP in the switch.

PIM
Displays the current status of PIM in the switch.

IGMP
Displays the current status of IGMP in the switch.

Container Application (ContainerApp)

This major application (Container_App) provides the following application-specific subviews:

- *Container Resource Information* (Page 27)
- *Container Type Report* (Page 27)
- *Container Logical Information* (Page 28)
- *Container Physical Information* (Page 29)
- *Container Network Address Information* (Page 29)

Container Resource Information

Access: *From the **Icon Subviews** menu for the ContainerApp Application icon, select **Container Resource**.*

This view provides the following information:

ID
A unique index that defines a specific physical resource for which this relationship exists.

Type
The type of physical resource for which this relationship is defined.

MIB Pointer
The value of this field defines the start of a MIB that can be used to determine more specific information about the given resource. This may include information about what physical modules the resource is connected to. It may also provide specific control information about the physical resource.

Container Type Report

Access: *From the **Icon Subviews** menu for the ContainerApp Application icon, select **Container Type**.*

This view provides the following information:

Device Type
Identifies the type of device or container. This could be a chassis, module, standalone box etc. A vendor's authoritative identification of this device or container. By convention, this value is allocated within the SMI enterprise subtree (1.3.6.1.4.1), and provides an easy and unambiguous means for determining ‘what kind of box' is being managed. If this information is not present or unknown, its value should be set to the **`contUnknownTypeID`**.

No. of Slots
Number of slots in the device. For bounded, slot-less systems, the value of this field shall be `zero`.

No. of Physical Changes
Depicts the number of physical changes that have occurred to this MIB. This includes additions and removal of components in the component table.

No. of Logical Changes
Depicts the number of logical changes that have occurred to this MIB. This includes all sets to name strings etc.

Serial Number
Reflects the revision level of the device. If no serial number is available for the device then this field will be the zero length string.

No. of Container slots
Number of slots in the container in which the device is installed. For bounded, slot-less systems, the value of this field will be zero.

Container slot no. for the device
The slot number in a container in which the device is installed. If the slot number is unknown then this value will be zero.

Container Logical Information

Access: *From the **Icon Subviews** menu for the ContainerApp Application icon, select **Container Logical**.*

This view provides the following information:

ID
A unique value identifying a component, which includes, but is not limited to, routers, bridges, and terminal servers. Multiple instances of a functional device may exist within the same container.

Type
Identifies a component within this container. By convention, this value is allocated within the SMI enterprises subtree (1.3.6.1.4.1), and provides an easy and unambiguous means for determining the component type. If this information is not present or unknown, its value should be set to the OBJECT IDENTIFIER {0 0}.

Name
A textual description of the component.

Version
A textual description of the version/revision level for this component's software.

ROCommStr
The read only community string to access MIBs registered to this component.

RWCommStr
The read write community string to access MIBs registered to this component.

SUCommStr
The super user community string to access MIBs registered to this component.

AdminStatus
The administrative status. Valid values are: enable, disable, and reset.

OperStatus
The operating status. Valid values are: unknown, invalid, enabled, testing, operational, error, disabled, and delete.

Container Physical Information

Access: *From the **Icon Subviews** menu for the ContainerApp Application icon, select **Container Physical**.*

This view provides the following information:

ID
The slot number containing this module.

Entries
The number of slots that this module occupies. Some modules require more than one physical front panel slot while only using a single backpanel slot. In this case this field will reflect the number of slots occupied by the physical module. This field will have a value of 1 for all single slot modules.

Entry Class
The class (or type) of slot.

Entry Type
Uniquely defines the module type. A vendor's authoritative identification for a module. By convention, this value is allocated within the SMI enterprises subtree (1.3.6.1.4.1), and provides an easy and unambiguous means for determining the type of module.

TimeStamp
The value of “sysUpTime” for this management entity, when this module was last (re-)initialized.

EntryStatus
The module status. Valid values are: `reset`, `poweroff`, `busy`, `crippled`, `operational`, `error`, `testing` and `booting`.

Container Network Address Information

Access: *From the **Icon Subviews** menu for the ContainerApp Application icon, select **Network Address View**.*

This view provides the following information:

Index
A unique value identifying a network address.

NetworkType
Identifies the Network type e.g., Inband, etc.

NetAddress
The network address of the device for a particular network.

VRRP Application (rfc2338App)

This major application (rfc2338App) provides one application-specific subviews. See *VRRP Configuration View* (Page 40).

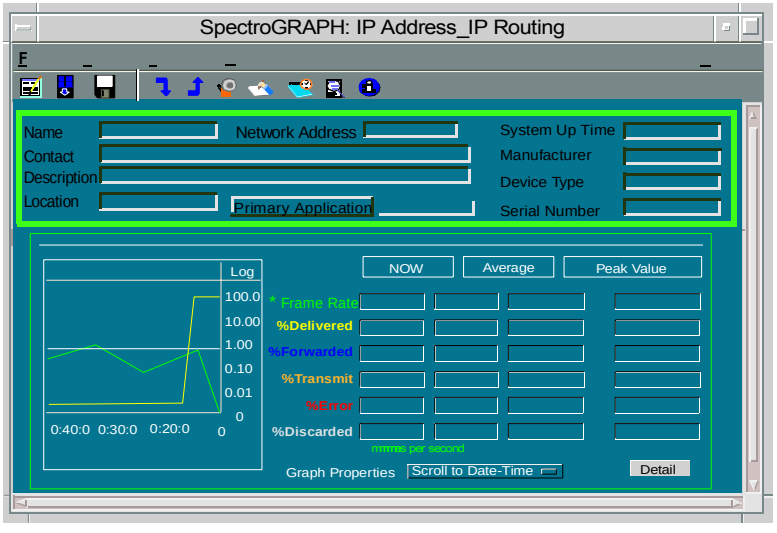
Performance Views

This section provides brief descriptions of the Performance views available for models of SmartSwitch Router devices in SPECTRUM.

Performance views (Figure 9) are available for the device, its ports, the modules it manages, and their ports. The performance views listed below provide statistical information such as load, frame rate, errors, collisions, etc. For the definitions for these statistics and a description of performance views, refer to ***SPECTRUM Views***.

- *Device Performance View* (Page 31)
- *IF Performance View* (Page 31)

Figure 9: Device Performance View



Device Performance View

Access: *From the **Icon Subviews** menu for the Device Icon, select **Performance**.*

This view provides performance information about the packets being passed through the device. The following packet statistics for the entire device are displayed in this view:

- Frame Rate
- % Delivered
- % Forwarded
- % Transmit
- % Error
- % Discarded

IF Performance View

Access: *From the **Icon Subviews** menu for the Interface icon in the Device Topology view, select **IF Performance**.*

This view provides performance information about the packets being passed through the Interfaces on the modules managed by the SmartSwitch Router. The following packet statistics for the interface selected are displayed in this view:

- Load
- Packet Rate
- % Error
- % Discarded

Configuration Views

This section describes the various Configuration views and subviews available for models of SmartSwitch Router devices in SPECTRUM.

Configuration views let you view and modify current settings for the modeled device and its interfaces, ports, and applications. The following Configuration views are available for models of SSR8000 and SSR8600 devices:

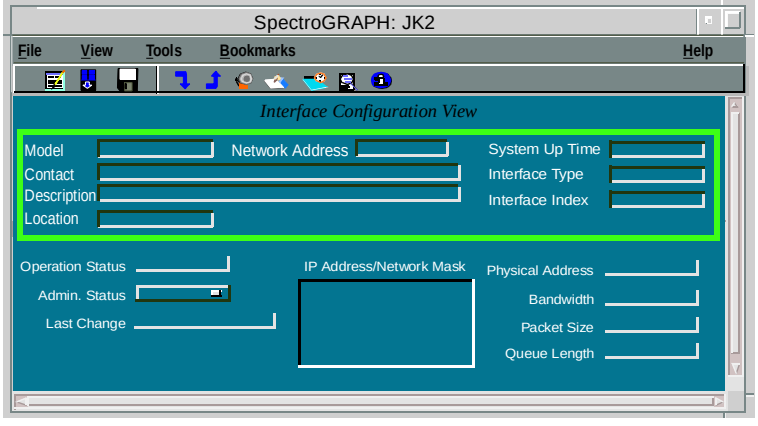
- *Interface Configuration View*
- *Capacity Application Configuration View* (Page 33)
- *SmartSwitch Router Configuration View* (Page 36)
- *VRRP Configuration View* (Page 40)

Interface Configuration View

Access: *From the* ***Icon Subviews*** *menu for a selected Interface icon in the Interface Device view, select* ***Interface Configuration***

Figure 10 displays the Interface Configuration view. Column headings are provided below for the selected interface:

Figure 10: Interface Configuration View



Operation Status
The current operational state of the interface. Valid values are: `Up`, `Down`, or `Testing`.

Admin. Status
The desired operational state of the interface. Valid values are: `Up`, `Down`, or `Testing`.

Last Change
The System UpTime value when the interface entered its current operational state.

Physical Address
The Ethernet (MAC) address of the interface.

Bandwidth
The estimated bandwidth of the interface, measured in bits per second. For interfaces that do not vary in bandwidth, or when no accurate estimate can be made, a nominal bandwidth is provided.

Packet Size
The largest packet that can be transmitted or received by the port, displayed in octets.

Queue Length
The length of the outbound packet queue, in packets.

Func Addr
Enables the IEEE Spanning Tree Protocol at the TrBRF level to use the IBM bridge functional.

Interface Instance
The interface index number for this table.

Capacity Application Configuration View

Access: *From the **Icon Subviews** menu for the CapacityApp Application icon, select **Configuration**.*

Slot Count
The maximum number of slots in the chassis, including the slot for the CPU module.

Slots Used
The number of slots used in the chassis. This number includes the slot used for the CPU module, if any.

Slots Free
The number of free slots in the chassis. This includes all of the available slots not used by the CPU or redundant CPU card.

CPU Redundancy
The chassis CPU redundancy capability of the SSR. Valid values are: `noSupport`, `available`, `enabled`, and `disabled`.

PS Redundancy
The chassis Power Supply redundancy capability of the SSR. Valid values are: noSupport, available, enabled, and disabled.

SF Redundancy
The chassis Switching Fabric redundancy capability of the SSR. Valid values are: noSupport, available, enabled, and disabled.

Memory Table

Clicking this button opens a table which displays the storage devices in the SSR.

CPU Table

Clicking this button opens a table which displays CPU statistics.

Task Table
A summary of the tasks running on a CPU enabled module in the chassis. Column headings are as follows:

Task
A unique index assigned to a task instance. This index is unique to the task for the time SSR is booted. If the task is terminated, the index will not be reused for another task that might become active in the system.

Name
The encrypted name assigned to this task. This is unique for each different type of task, but there may be multiple instances of the same task running in the system.

Sched
The number of times this task has been scheduled to run. This is a cumulative count from the time the SSR was started.

Status
The current status of this task.

MemUsed
The size of the memory consumed by this task. This can be used to monitor any excess memory used by a particular task and is expressed in bytes.

Capacity - Memory Table View

Access: *From the **Capacity Application Configuration View**, click on the **Memory Table** button.*

A summary of the non-volatile storage devices in the SSR. Column headings are as follows:

Index
An index or enumeration for the entries of a particular memory type. This corresponds to:

- Interface index for L2Hardware Type

- Module index for L3Hardware Type
- Enumeration for everything else.

Description
The description of the memory device.

Size
Memory device total memory capacity expressed in blocks.

Free
Device free memory in blocks. This will include any unused memory between used memory blocks and is calculated by subtracting the memory used from the size of the memory device.

Used
Size of used memory on the memory device. This includes the blocks of memory that are only partially used and is expressed in blocks.

BlockSize
Size of the memory blocks on the memory device. This is the minimum block size of memory returned when memory is requested and is expressed in bytes.

Failures
The number of times a memory allocation in this memory device has failed. In the case of L2Hardware and L3Hardware types it expresses the number of times a Full Hash Bucket condition has been met.

Removable
Indicates if the memory type is removable. Valid values are: yes and no.

Capacity - CPU Table View

Access: *From the **Capacity Application Configuration View**, click on the **CPU Table** button.*

Summary of CPU statistics. It is assumed that there is only one CPU per line card.Index. Column headings are as follows:

Index
The slot index in which the current CPU is residing.

CurrUtil
The CPU utilization expressed as an integer percentage. This is calculated over the last 5 seconds at a 0.1 second interval as an average.

L3Learned
The total number of new layer 3 (L3) flows the CPU has processed and programmed into the L3 hardware flow tables. L3 flows are packets for IP or IPX protocols that will be routed from one subnet to another. Bridged flows or IP and IPX

flows that originate and terminate in the same subnet are accounted for by **L2Learned**.

L3Aged
The total number of L3 flows that have been removed from the L3 hardware flow tables across all modules by the L3 aging task. This number may increase quickly if routing protocols are not stable. Removal or insertion of routes into the forwarding table will cause premature aging of flows. Flows are normally aged/removed from the hardware when there are no more packets being sent for a defined time period. This counter is cumulative from the time the system started.

L2Learned
The number of Layer 2 (L2) flows or addresses learned. The intended result here is to see how many stations attempt to establish switched communication through the SSR.

L2Aged
The total number of L2 addresses or flows aged out. Hosts that end switched communication through the SSR are aged out every 15 seconds.

NIA-rcvd
The total number of packets received by the NIA chip. This is useful in gauging how many packets are forwarded to the CPU for processing.

NIA-txd
The total number of packets transmitted by the NIA chip. This is useful in seeing how much the CPU is communicating directory with management stations and other routers.

SmartSwitch Router Configuration View

Access: *From the **Icon Subviews** menu for the Device icon, select **Configuration**.*

Contact Status
The contact status of the model.

Number of Interfaces
The number of interfaces on the model.

Redundancy and Model Reconfiguration Options

Clicking this button opens the *Redundancy and Model Reconfiguration Options View* (Page 37).

IP IF Address Translation

Clicking this button opens the *Interface Address Translation Table* (Page 39).

TFTP Configuration

Clicking this button opens the *SmartSwitch Router TFTP View* (Page 39).

Interface Configuration Table

This section provides the following information:

Description
Contains the name of the device and the hardware revision number.

Type
The type of module plugged into the slot. Module types `OC8600` and `OC860x(860x)` represent the mother board with the CPU and system memory. Module state `none` represents a slot with no modules plugged in.

Bandwidth
The estimated bandwidth of the interface, measured in bits per second. For interfaces that do not vary in bandwidth, or no accurate estimate can be made, a nominal bandwidth is provided.

Physical Address
The Ethernet (MAC) address of the interface.

Operation Status
The current operational state of the interface. Valid values are: `Up`, `Down`, or `Testing`.

Admin Status
The desired operational state of the interface. Valid values are: `Up`, `Down`, or `Testing`.

Last Change
The System UpTime value when the interface entered its current operational state.

Queue Length
The length of the outbound packet queue, in packets.

Packet Size
The largest packet that can be transmitted or received by the port, displayed in octets.

Redundancy and Model Reconfiguration Options View

Access: *From the **Icon Subviews** menu for the Application icon, select **Rtr Redundancy**.*

This view allows you to enable redundant addresses, have SPECTRUM notify you of a redundancy update, and reconfigure aspects of your network connections. Column headings are as follows:

Redundancy Administrative Status

Setting this button to **Enabled** will cause SPECTRUM to display a redundant address from the Redundant Preferred Address list when the primary address is not accessible.

Automatically Reconfigure Interfaces

Setting this button to **True** will cause SPECTRUM to monitor the number of interfaces for this device. If a change is detected by SPECTRUM, the interfaces displayed in SPECTRUM will be updated to reflect the change.

Reconfigure due to LINK UP/Down events

Setting this button to **True** will cause SPECTRUM to verify the interfaces displayed when a LINK UP or LINK DOWN event is received.

Device Discovery after Reconfiguration

Setting this button to **True** will cause SPECTRUM to verify the interfaces displayed after a model reconfiguration occurs.

Generate Redundancy Alarms

Setting this button to **True** will cause SPECTRUM to generate an alarm when a redundant address has been selected.

Create Sub Interfaces

Setting this button to **True** will cause SPECTRUM to display sub-interfaces in the DevTop view when RFC1573 is supported by the device.

Topologically Relocate the Model

Setting this button to **True** will cause SPECTRUM to relocate the model for this device to a different topological location as part of AutoDiscovery.

Button Explanations

Clicking this button will display a window that allows you to read definitions for the buttons included in the Redundancy and Model Reconfiguration Options view.

Reconfigure Model

Clicking this button will cause SPECTRUM to verify and change the interfaces displayed for this

device when necessary. If the **Topologically Relocate the Model** button is set to **True**, this button will also execute a device discovery.

Discover LANs

Clicking this button will cause SPECTRUM to execute a device discovery on this devices connections.

Interface Address Translation Table

Access: *From the **SmartSwitch Router Configuration** view, click on the **IP IF Address Translation** button.*

This table provides the physical and network addresses associated with the interface index.

Interface Index
A pointer to the entry in the Interface Table corresponding to this port.

Physical Address
The Ethernet (MAC) address of the interface.

Network Address
The IP Address of the interface.

SmartSwitch Router TFTP View

Access: *From the **SmartSwitch Router Configuration View**, click on the **TFTP Configuration** button.*

This view allows you to manage SmartSwitch Router configuration files and perform file transfers to and from the manager and agent. Column headings are as follows:

Manager Address
Displays the address for the manager used by the agent for CFG transfer operations. The value `0.0.0.0` is the default. The address must be a unicast address that is reachable from the agent.

File Name
Displays the file name to be retrieved from the tftp server at the host manager address or the file name to be written to. The default is blank.

Transfer Operation
Displays the transfer operation to be performed. Send and receive operations use tftp to transfer files from the manager to the agent. Table 9 lists possible operations:

Table 9: Transfer Operations

Operation	Description
noop	No operation.
sendConfigToAgent	Send configuration to agent.
receiveConfigFromAgent	Receive configuration from agent.
receiveBootlogFromAgent	Receive boot log from the agent.

Activate Transfer
Allows you to activate the file transfer operation. Enter **`True`** to activate the file transfer. Enter **`False`** to stop it. The **Transfer Status** field will displays the current status. `False` is the default.

Transfer Status
Displays the current transfer status. Conditions are: `idle`, `sending`, `receiving`, `transfer`, and `complete`.

Last Error
Displays the reason code for the last transfer operation.

Last Error Reason
Displays details for the last error code displayed under the **Last Error** field.

Activate File
Enter **`True`** to activate a new configuration once a file transfer to the SmartSwitch router has been completed.

VRRP Configuration View

Access: *From the **Icon Subviews** menu for the rfc2338App Application icon, select **Configuration**.*

The Virtual Router Redundancy Protocol Configuration view displays the following information:

Node Version
The version field specifies the VRRP protocol version of this packet.

Trap Control
Indicates whether the VRRP-enabled router will generate SNMP traps for events defined in this MIB. `Enabled` results in SNMP traps; `disabled` means no traps are sent.

Packet Source
The IP address of an inbound VRRP packet.

Authorisation Error Type
The authorization error type. Valid values are: `InvalidAuthtype`, `authTypeMismatch`, and `authFailure`.

VRRP Operations Table

This table provides the following information:

Index

This field contains the Virtual Router Identifier (VRID).

Virt MAC Address

The virtual MAC address of the virtual router. This is derived as follows: 00-00-5E-00-01-<VRID>.

Where the first three octets consist of the IANA's OUI; the next two octets indicate the address block of the VRRP protocol; and the remaining octets consist of the VRID.

State

The mandatory state of the virtual router. This field has three defined values, as described in Table 10:

Table 10: Virtual Router States

State	Description
initialize	The virtual router is waiting for is startup event.
backup	The virtual router is monitoring the availability of the master router.
master	The virtual router is forwarding packets for IP addresses that are associated with this router.

Setting the **Admin State** (below) initiates transitions in the value of this field.

Admin State

This field will enable/disable the virtual router function. Setting the value to up, will transition the **State** of the virtual router from "initialize'" to "backup" or "master"; setting the value to down, will transition the router from "master" or "backup" to "initialize". State transitions may not be immediate; they sometimes depend on other factors, such as the interface (IF) state.

This field must be set to down prior to modifying the other read-write fields in the conceptual row. The value of *Status* (Page 43) must be "active", signifying that the conceptual row is valid (i.e.,

the fields are correctly set), in order for this field to be set to up.

Pri
The priority to be used for the virtual router master election process. Higher values imply higher priority.

A priority of 0, although not settable, is sent by the master router to indicate that this router has ceased to participate in VRRP and a backup virtual router should transition to become a new master.

A priority of 255 is used for the router that owns the associated IP address(es). The default value is 100.

IP Addr Cnt
The number of IP addresses that are associated with this virtual router. This number is equal to the number of rows in the vrrpAssoIpAddrTable that correspond to a given IF index/VRID pair.

Master IP Addr
The master router's real (primary) IP address. This is the IP address listed as the source in VRRP advertisement last received by this virtual router.

Primary IP Addr
In the case where there is more than one IP address for a given **Index**, this field is used to specify the IP address that will become the **Master IP Addr**, should the virtual router transition from backup to master. If this field is set to 0.0.0.0, the IP address which is numerically lowest will be selected.

Auth Type
Authentication type used for VRRP protocol exchanges between virtual routers. This value of this field is the same for a given **Index**. Valid values are described in Table 11:

Table 11: Authentication Types

Authentication Type	Description
noAuthentication	VRRP protocol exchanges are not authenticated.
simpleTextPassword	Exchanges are authenticated by a clear text password.
ipAuthenticationHeader	Exchanges are authenticated using the IP authentication header.

Auth Key
The Authentication Key. This field is set according to the value of **Auth Type** ("simpleTextPassword" or "ipAuthenticationHeader"). If the length of the value is less than 16 octets, the agent will left adjust and zero fill to 16 octets. The value of this field is the same for a given ifIndex.

When read, this value always returns an Octet String of length zero.

Adv Intvl
The time interval, in seconds, between sending advertisement messages. Only the master router sends VRRP advertisements. The default is `1 second`.

Preempt Mode
Controls whether a higher priority virtual router will preempt a lower priority master. Default is `True`.

Up Time
This is the value of the "sysUpTime" field when this virtual router (i.e., the **State**) transitioned out of "initialized."

Protocol
The particular protocol being controlled by this Virtual Router. Valid values are: `ip`, `bridge`, `decnet`, and `other`.

Status
The row status variable, used in accordance to installation and removal conventions for conceptual rows.

The state that this field transitions to when set is based on a determination of whether the read-write fields in the row have been correctly initialized for virtual router operation. A row in which not all of the fields are correctly set is considered 'incomplete'.

The row status of a mandatory active row in the vrrpOperTable is also constrained by the operational state of the corresponding virtual router. Prior to setting this field from `active` to a different value, **Admin State** must be set to "down", and the **State** field be transitioned to "initialize."

The row status column has six defined values, as defined in Table 12:

Table 12: Row Status

Row Status	Description
active (read/set)	When this value is read, it indicates that all the read-write fields (in the row) required for virtual router operation have been correctly initialized such that the respective virtual router can be made operational by setting the **Admin State** to "up". When set to `active`, no other fields in the conceptual row, with the exception of **Admin State**, can be modified. When set, the agent will transition the value of rowstatus to 'notReady' if the row is incomplete.
notInService (read/set)	When set, allows the fields in the row to be modified by a management station, thus changing the operational characteristics of the corresponding virtual router.
notReady (read)	The agent sets the field to this state to indicate that the conceptual row exists, but is lacking initialization of one or more fields required for virtual router operation.

Table 12: Row Status

Row Status	Description
createAndGo (set)	Set by a management station wishing to create a new instance of a virtual router and to have its status automatically set to `active`, making it available for use by a virtual router. Upon receiving a request to set the row status to this value, the agent transitions the rowstatus to `active` if the other settable fields in the row have been correctly initialized. If the row is incomplete, the agent transitions the state to `notReady`.
createAndWait (set)	Set by a management station wishing to create a new instance of a virtual router but not make it available for use. When this value is set, rowstatus transitions to `notInService` if the row has been correctly initialized; if the row is incomplete, row status will become `notReady`.
destroy (set)	Deletes the conceptual row, and hence, the corresponding instance of a virtual router.

Core Watch Application

The Core Watch application allows you to access information for the chassis and the line modules it contains.

CoreWatch is a device management and configuration application for SmartSwitch Routers. It provides configuration, monitoring, and reporting capabilities with the assistance of wizards, property sheets, and drag-and-drop operations. CoreWatch provides access to Configuration Expert, which is a utility that makes it easier to configure routers, virtual local area networks (VLANs), application-level Quality of Service (QoS) policies, and security filters.

CoreWatch management features include:

- Java-based graphical user interface (GUI).
- Simplified bridging configuration.
- Simplified routing configuration.
- Quality of Service (QoS) policy management.
- QoS is a set of parameters that assign priorities to different types of traffic, define flows for Internet Protocol (IP) and Internetwork Packet Exchange (IPX) packet fields, assign a precedence to the fields of the flows you define, and establish queuing policies.
- Configuration of security filters and access control lists (ACLs). An ACL is a list the SSR keeps to control access to or from various services.
- Drag-and-drop VLAN setup and administration.
- Detailed reporting in the hypertext markup language (HTML) format.
- For more detailed information on using Core Watch, refer to the ***Core Watch User's Guide***.

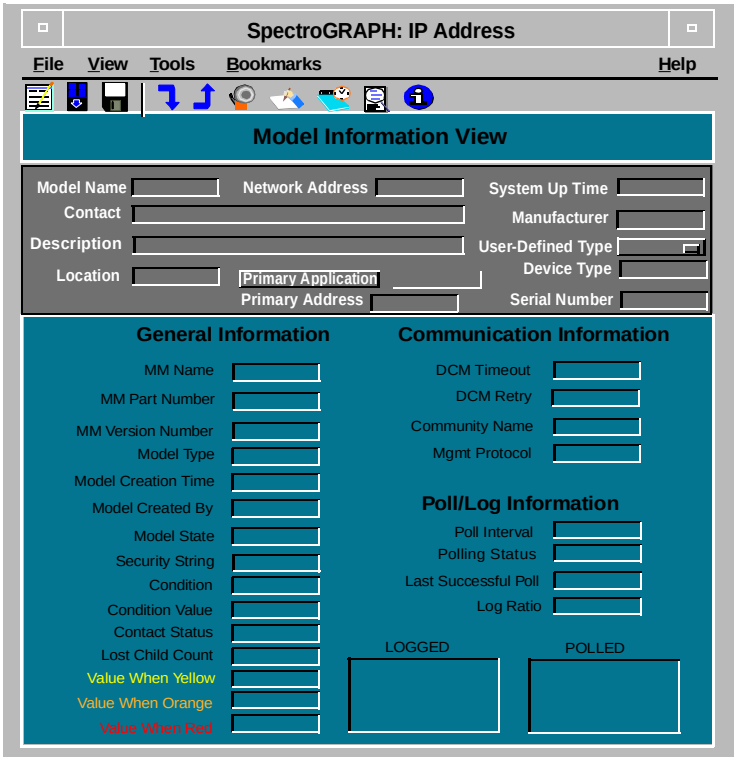
Model Information View

This section provides a brief overview of the Model Information view.

This view displays administrative information about the device and its applications and lets you set thresholds and alarm severity for the device.

Figure 11 shows a sample Model Information view. The layout of this view is the same for all model types in SPECTRUM but some information will vary depending on the model it defines. Refer to the ***SPECTRUM Views*** documentation for a complete description of this view.

Figure 11: Model Information View



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